

Customer No.: 31561
Application No.: 10/065,091
Docket NO.: 5486-US-PA

REMARKS

Applicants respectfully submit that Nakamura et al. (U.S. Patent No. 5,691,791; hereafter Nakamura) and Kim et al. (U.S. Patent No. 6,038,008; hereafter Kim'008) in view of Kim et al. (U.S. Patent No. 6,693,689; hereafter Kim'689) is legally deficient for the purpose of rendering claims 1-13 and 44-55 unpatentable because the reference or references, taken alone or combined, fails to teach or suggest each and every element recited in the claims.

The Applicants' invention is directed to a liquid crystal display structure capable of minimizing liquid crystal misalignment in the liquid crystal layer and liquid crystal cell gap non-uniformity problem. More specifically, each pixel portion of the liquid crystal display (LCD) according to the present invention comprises an organic insulating layer, a conformal reflective layer, a dielectric layer and a first transparent conductive layer. The dielectric layer located over the conformal reflective layer possesses a substantially flat upper surface in touch with the first transparent conductive layer. More specifically, the conformal reflective layer is not electrically connected to the thin film transistor but the transparent conductive layer is electrically connected to the thin film transistor. Although the organic insulating layer having a non-planar surface is an essential aspect of the LCD structure, the uneven surface of the organic insulating layer may lead to liquid crystal misalignment and liquid crystal cell gap non-uniformity problems. However, the transparent dielectric layer having a relatively planar upper surface is formed over the organic insulating layer. The first transparent electrode over the insulator layer electrically coupled to the thin film transistor

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serves the purpose of controlling the liquid crystal above it while the conformal reflector serves to reflect the light passing through the transparent electrode. With this structural arrangement, the liquid crystal layer has a uniform thickness throughout and hence problems caused by having a non-planar reflection layer are avoided.

As stated in the previous Advisory, the way to combine Nakamura with Kim'008 is to introduce the protection layer 126 and the pixel electrode 104 disclosed by Kim'008 on the reflection electrode 288 and below the alignment layer 298. Applicants respectfully submit that the combination cited in the previous Advisory contains conflicts between Nakamura and Kim'008. In Nakamura, as shown in Fig. 27, it is clear that the reflection electrode is electrically connected to the thin film transistor 290. Furthermore, as shown in Fig. 7H of Kim'008, it is clear that the pixel electrode 104 is electrically connected to the drain electrode 115b of the thin film transistor (col. 7, lines 35-40). Apparently, none of Nakamura and Kim'008 teach that the reflection electrode and the pixel electrode can be isolated from the thin film transistor. Moreover, none of Nakamura and Kim'008 suggest that there can be two electrodes co-existing in a single pixel and stacked with each other. People skill in the art should understand that the functionality of the reflective electrode is equal to that of the pixel electrode. Hence, there is no reason to redundantly form an extra electrode over the original reflection electrode of Nakamura.

Additionally, not only the conflict exists in the combination of Nakamura with Kim'008, but also the combination result still cannot possess the same advantage what claimed by the present invention. As shown in Fig. 7H of Kim'008, it is clear that the surface of the protection layer 126 is roughness. Furthermore, Kim further emphasizes

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that the roughened surface of the protection layer 126, which is the claimed feature of Kim'008, is essential for increasing the adhesion between the protection layer 126 and the ITO, which is the pixel electrode 104. Even though the pixel electrode has relatively even top surface, the pixel electrode 104 exposed a large portion of the roughened surface of the protection layer 126. Hence, even if skilled artisan did combine Nakamura with Kim'008 in a way suggested in the previous Advisory, the protection layer 126 with the roughened surface exposed by the pixel electrode in the combination result cannot provide a substantially flat top surface as required in the present invention.

For at least the above reasons that Nakamura and Kim'008 in view of Kim'689 fails to teach or suggest each element in the claims, Applicants respectfully submit that the combination of Nakamura and Kim is legally deficient to render claims 1 and 44 unpatentable. Claims 2-13 and 45-55, which depend from claims 1 and 44 respectively, are also patentable over Nakamura in view of Kim, at least because of their dependency from an allowable base claim. Applicants respectfully assert that these claims are in condition for allowance. Thus, reconsideration and withdrawal of this rejection are respectively requested.

Newly Added Claims

Applicants have added claims 56-68 for further limiting the present invention by introducing that the dielectric layer substantially has a planar upper surface. It is believed that no new matter is introduced into the application by adding the new set of claims.

For at least the above reasons that Nakamura and Kim'008 in view of Kim'689

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fails to teach or suggest each element in the claims, Applicants respectfully submit that the combination of Nakamura and Kim does not render claims 56-68 unpatentable.

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CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims 1-13 and 44-68 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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Respectfully submitted,

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